

SEQUENCE LISTING

(1) GENERAL INFORMATION:

(I) APPLICANT:

- (A) NAME: THE SCRIPPS RESEARCH INSTITUTE
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(ii) TITLE OF INVENTION: CASSAVA VEIN MOSAIC VIRUS PROMOTERS AND
USES THEREOF

(iii) NUMBER OF SEQUENCES: 36

(iv) COMPUTER READABLE FORM:

- (A) MEDIUM TYPE: Floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: PatentIn Release #1.0, Version #1.25

(v) CURRENT APPLICATION DATA:

- (A) APPLICATION NUMBER: PCT/US 97/
(B) FILING DATE: 20-JUN-1997

(vi) PRIOR APPLICATION DATA:

- (A) APPLICATION NUMBER: US 60/020,129
(B) FILING DATE: 20-JUN-1996

(2) INFORMATION FOR SEQ ID NO:1:

(I) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 392 base pairs

- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

15 AGCTCAGCAA GAAGCAGATC AATATGCGGC ACATATGCAA CCTATGTTCA AAAATGAAGA 60

ATGTACAGAT ACAAGATCCT ATACTGCCAG AATACGAAGA AGAATACGTA GAAATTGAAA 120

AAGAAGAACC AGGCGAAGAA AAGAATCTTG AAGACGTAAG CACTGACGAC AACAAATGAAA 180

20 AGAAGAAGAT AAGGTCGGTG ATTGTGAAAG AGACATAGAG GACACATGTA AGGTGGAAAA 240

TGTAAGGGCG GAAAGTAACC TTATCACAAA GGAATCTTAT CCCCCACTAC TTATCCTTTT 300

25 ATATTTTTTC GTGTCATTTT TGCCCTTGAG TTTTCCTATA TAAGGAACCA AGTTCGGCAT 360

TTGTGAAAAC AAGAAAAAAT TTGGTGTAAG CT 392

(2) INFORMATION FOR SEQ ID NO:2:

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(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 524 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

5 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

GGTACCAGAA GGTAATTATC CAAGATGTAG CATCAAGAAT CCAATGTTTA CGGGAAAAAC 60
TATGGAAGTA TTATGTGAGC TCAGCAAGAA GCAGATCAAT ATGCGGCACA TATGCAACCT 120
10 ATGTTCAAAA ATGAAGAATG TACAGATACA AGATCCTATA CTGCCAGAAT ACGAAGAAGA 180
ATACGTAGAA ATTGAAAAAG AAGAACCAGG CGAAGAAAAG AATCTTGAAG ACGTAAGCAC 240
15 TGACGACAAC AATGAAAAGA AGAAGATAAG GTCGGTGATT GTGAAAGAGA CATAGAGGAC 300
ACATGTAAGG TGGAAAATGT AAGGGCGGAA AGTAACCTTA TCACAAAGGA ATCTTATCCC 360
CCACTACTTA TCCTTTTATA TTTTCCGTG TCATTTTGC CCTTGAGTTT TCCTATATAA 420
20 GGAACCAAGT TCGGCATTG TGAAAACAAG AAAAAATTG GTGTAAGCTA TTTTCTTTGA 480
AGTACTGAGG ATACAAGTTC AGAGAAATTT GTAAGTTTGA ATTC 524

25 (2) INFORMATION FOR SEQ ID NO:3:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 526 base pairs

(B) TYPE: nucleic acid

30 (C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

35 (iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

TCTAGACCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60
5 ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC 120
CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA 180
GAATACGTAG AAATTGAAAA AGAAGAACCA GCGAAGAAA AGAATCTTGA AGACGTAAGC 240
10 ACTGACGACA ACAATGAAAA GAAGAAGATA AGGTCGGTGA TTGTGAAAGA GACATAGAGG 300
ACACATGTAA GGTGGAAAAT GTAAGGGCGG AAAGTAACCT TATCACAAAG GAATCTTATC 360
15 CCCCACTACT TATCCTTTTA TATTTTTC CG TGTCATTTTT GCCCTTGAGT TTTCTATAT 420
AAGGAACCAA GTTCGGCATT TGTGAAAACA AGAAAAAATT TGGTGTAAGC TATTTTCTTT 480
GAAGTACTGA GGATACAAGT TCAGAGAAAT TTGTAAGTTT GAATTC 526

(2) INFORMATION FOR SEQ ID NO:4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 411 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

GGATCCTATG TTCAAAAATG AAGAATGTAC AGATACAAGA TCCTATACTG CCAGAATACG 60

AAGAAGAATA CGTAGAAATT GAAAAAGAAG AACCAGGCGA AGAAAAGAAT CTTGAAGACG 120
TAAGCACTGA CGACAACAAT GAAAAGAAGA AGATAAGGTC GGTGATTGTG AAAGAGACAT 180
5 AGAGGACACA TGTAAGGTGG AAAATGTAAG GGC GGAAAGT AACCTTATCA CAAAGGAATC 240
TTATCCCCCA CTACTTATCC TTTTATATTT TTCCGTGTCA TTTTGGCCCT TGAGTTTTC 300
TATATAAGGA ACCAAGTTCG GCATTTGTGA AAACAAGAAA AAATTTGGTG TAAGCTATTT 360
10 TCTTTGAAGT ACTGAGGATA CAAGTTCAGA GAAATTTGTA AGTTTGAATT C 411

(2) INFORMATION FOR SEQ ID NO:5:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 305 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

GGATCCTGAA GACGTAAGCA CTGACGACAA CAATGAAAAG AAGAAGATAA GGTCGGTGAT 60
TGTGAAAGAG ACATAGAGGA CACATGTAAG GTGGAAAATG TAAGGGCGGA AAGTAACCTT 120
35 ATCACAAAGG AATCTTATCC CCCACTACTT ATCCTTTTAT ATTTTCCGT GTCATTTTGT 180
CCCTTGAGTT TTCCTATATA AGGAACCAAG TTCGGCATTG GTGAAAACAA GAAAAAATTT 240
GGTGTAAGCT ATTTTCTTTG AAGTACTGAG GATACAAGTT CAGAGAAATT TGTAAGTTTG 300

AATTC

305

(2) INFORMATION FOR SEQ ID NO:6:

5 (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 261 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

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(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

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GGATCCGGTC GGTGATTGTG AAAGAGACAT AGAGGACACA TGTAAGGTGG AAAATGTAAG 60

GGCGGAAAGT AACCTTATCA CAAAGGAATC TTATCCCCCA CTACTTATCC TTTTATATTT 120

25 TTCCGTGTCA TTTTGGCCCT TGAGTTTTC TATATAAGGA ACCAAGTTCG GCATTTGTGA 180

AAACAAGAAA AAATTTGGTG TAAGCTATTT TCTTTGAAGT ACTGAGGATA CAAGTTCAGA 240

GAAATTTGTA AGTTTGAATT C 261

30

(2) INFORMATION FOR SEQ ID NO:7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 193 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: DNA (genomic)

09202333 012100

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

GGATCCTTAT CACAAAGGAA TCTTATCCCC CACTACTTAT CCTTTTATAT TTTCCGTGT 60

10

CATTTTGGCC CTTGAGTTT CCTATATAAG GAACCAAGTT CGGCATTGT GAAAACAAGA 120

AAAAATTGG TGTAAGCTAT TTTCTTTGAA GTACTGAGGA TACAAGTTCA GAGAAATTG 180

15

TAAGTTGAA TTC 193

(2) INFORMATION FOR SEQ ID NO:8:

(i) SEQUENCE CHARACTERISTICS:

20

(A) LENGTH: 143 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

GGATCCGTGT CATTTTGGCC CTTGAGTTT CCTATATAAG GAACCAAGTT CGGCATTGT 60

GAAAACAAGA AAAAATTGG TGTAAGCTAT TTTCTTTGAA GTACTGAGGA TACAAGTTCA 120

GAGAAATTG TAAGTTGAA TTC 143

(2) INFORMATION FOR SEQ ID NO:9:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 420 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

TCTAGACCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60
ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGGATC 120
CTGAAGACGT AAGCACTGAC GACAACAATG AAAAGAAGAA GATAAGGTCG GTGATTGTGA 180
AAGAGACATA GAGGACACAT GTAAGGTGGA AAATGTAAGG GCGGAAAGTA ACCTTATCAC 240
AAAGGAATCT TATCCCCAC TACTTATCCT TTTATATTTT TCCGTGTCAT TTTTGCCCTT 300
GAGTTTTCTT ATATAAGGAA CCAAGTTCGG CATTTGTGAA AACAAGAAAA AATTTGGTGT 360
AAGCTATTTT CTTTGAAGTA CTGAGGATAC AAGTTCAGAG AAATTTGTAA GTTTGAATTC 420

(2) INFORMATION FOR SEQ ID NO:10:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 482 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

5 (iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

TCTAGACCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60

15 ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC 120

CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA 180

GAATACGTAG AAATTGAAAA AGAAGAACCA GCGCAAGAAA AGGATCCGGT CGGTGATTGT 240

20 GAAAGAGACA TAGAGGACAC ATGTAAGGTG GAAAATGTAA GGGCGGAAAG TAACCTTATC 300

ACAAAGGAAT CTTATCCCCC ACTACTTATC CTTTTATATT TTTCCGTGTC ATTTTGTCCC 360

25 TTGAGTTTTT CTATATAAGG AACCAAGTTC GGCATTTGTG AAAACAAGAA AAAATTTGGT 420

GTAAGCTATT TTCTTTGAAG TACTGAGGAT ACAAGTTCAG AGAAATTTGT AAGTTTGAAT 480

TC 482

30

(2) INFORMATION FOR SEQ ID NO:11:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 458 base pairs

35 (B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

09202838.012100

TCTAGACCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA	60
ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC	120
CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA	180
GAATACGTAG AAATTGAAAA AGAAGAACCA GGC GAAGAAA AGAATCTTGA AGACGTAAGC	240
ACTGACGACA ACAATGAAAA GAAGAGGATC CTTATCACAA AGGAATCTTA TCCCCCACTA	300
CTTATCCTTT TATATTTTTC CGTGTCATTT TTGCCCTTGA GTTTTCTTAT ATAAGGAACC	360
AAGTTCGGCA TTTGTGAAAA CAAGAAAAAA TTTGGTGTA GCTATTTTCT TTGAAGTACT	420
GAGGATACAA GTTCAGAGAA ATTTGTAAGT TTGAATTC	458

25 (2) INFORMATION FOR SEQ ID NO:12:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 468 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

35

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

TCTAGACCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60
5 ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC 120
CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA 180
GAATACGTAG AAATTGAAAA AGAAGAACCA GCGGAAGAAA AGAATCTTGA AGACGTAAGC 240
10 ACTGACGACA ACAATGAAAA GAAGAAGATA AGGTCGGATC CTTATCACAA AGGAATCTTA 300
TCCCCCACTA CTTATCCTTT TATATTTTTC CGTGTCATTT TTGCCCTTGA GTTTTCCTAT 360
15 ATAAGGAACC AAGTTCGGCA TTTGTGAAAA CAAGAAAAAA TTTGGTGTA GCTATTTTCT 420
TTGAAGTACT GAGGATACAA GTTCAGAGAA ATTTGTAAGT TTGAATTC 468

(2) INFORMATION FOR SEQ ID NO:13:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 491 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

TCTAGACCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60
ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC 120

CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA 180
GAATACGTAG AAATTGAAAA AGAAGAACCA GCGAAGAAA AGAATCTTGA AGACGTAAGC 240
5 ACTGACGACA ACAATGAAAA GAAGAAGATA AGGTCGGTGA TTGTGAAAGA GACATAGAGG 300
ATCCTTATCA CAAAGGAATC TTATCCCCCA CTACTTATCC TTTTATATTT TTCCGTGTCA 360
TTTTTGCCCT TGAGTTTTCC TATATAAGGA ACCAAGTTCG GCATTTGTGA AAACAAGAAA 420
10 AAATTTGGTG TAAGCTATTT TCTTTGAAGT ACTGAGGATA CAAGTTCAGA GAAATTTGTA 480
AGTTTGAATT C 491

15 (2) INFORMATION FOR SEQ ID NO:14:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 408 base pairs
(B) TYPE: nucleic acid
20 (C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

25 (iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

30 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

TCTAGACCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60
35 ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC 120
CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA 180
GAATACGTAG AAATTGAAAA AGAAGAACCA GCGAAGAAA AGAATCTTGA AGACGTAAGC 240

ACTGACGACA ACAATGAAAA GAAGAGGATC CGTGTCATTT TTGCCCTTGA GTTTTCCTAT 300

ATAAGGAACC AAGTTCGGCA TTTGTGAAAA CAAGAAAAAA TTTGGTGTA GCTATTTTCT 360

5 TTGAAGTACT GAGGATACAA GTTCAGAGAA ATTTGTAAGT TTGAATTC 408

(2) INFORMATION FOR SEQ ID NO:15:

(i) SEQUENCE CHARACTERISTICS:

10 (A) LENGTH: 418 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

25 TCTAGACCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60

ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC 120

CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA 180

30
GAATACGTAG AAATTGAAAA AGAAGAACCA GGCGAAGAAA AGAATCTTGA AGACGTAAGC 240

ACTGACGACA ACAATGAAAA GAAGAAGATA AGGTCGGATC CGTGTCATTT TTGCCCTTGA 300

35 GTTTTCCTAT ATAAGGAACC AAGTTCGGCA TTTGTGAAAA CAAGAAAAAA TTTGGTGTAA 360

GCTATTTTCT TTGAAGTACT GAGGATACAA GTTCAGAGAA ATTTGTAAGT TTGAATTC 418

(2) INFORMATION FOR SEQ ID NO:16:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 441 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

TCTAGACCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60
ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC 120
CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA 180
GAATACGTAG AAATTGAAAA AGAAGAACCA GGCGAAGAAA AGAATCTTGA AGACGTAAGC 240
ACTGACGACA ACAATGAAAA GAAGAAGATA AGGTCGGTGA TTGTGAAAGA GACATAGAGG 300
ATCCGTGTCA TTTTGGCCCT TGAGTTTTCC TATATAAGGA ACCAAGTTCG GCATTTGTGA 360
AAACAAGAAA AAATTTGGTG TAAGCTATTT TCTTTGAAGT ACTGAGGATA CAAGTTCAGA 420
GAAATTTGTA AGTTTGAATT C 441

(2) INFORMATION FOR SEQ ID NO:17:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 476 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

5 (iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

10 TCTAGACCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60
ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC 120
15 CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA 180
GAATACGTAG AAATTGAAAA AGAAGAACCA GGCGAAGAAA AGAATCTTGA AGACGTAAGC 240
ACTGACGACA ACAATGAAAA GAAGAAGATA AGGTCGGTGA TTGTGAAAGA GACATAGAGG 300
20 ACACATGTAA GGTGGAAAAT GTAAGGGCGG AAAGGATCCG TGTCATTTTT GCCCTTGAGT 360
TTTCCTATAT AAGGAACCAA GTTCGGCATT TGTGAAAACA AGAAAAAATT TGGTGTAAGC 420
25 TATTTTCTTT GAAGTACTGA GGATACAAGT TCAGAGAAAT TTGTAAGTTT GAATTC 476

(2) INFORMATION FOR SEQ ID NO:18:

(i) SEQUENCE CHARACTERISTICS:

30 (A) LENGTH: 31 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

5 ACCGGTACCA GAAGGTAATT ATCCAAGATG T

31

(2) INFORMATION FOR SEQ ID NO:19:

(i) SEQUENCE CHARACTERISTICS:

10

(A) LENGTH: 30 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

415

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

20

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

25 CGGAATTCAA ACTTACAAAT TTCTCTGAAG

30

(2) INFORMATION FOR SEQ ID NO:20:

(i) SEQUENCE CHARACTERISTICS:

30

(A) LENGTH: 34 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

35

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

5 CGCGATCCAG ACTGAATGCC CACAGGCCGT CGAG

34

(2) INFORMATION FOR SEQ ID NO:21:

(i) SEQUENCE CHARACTERISTICS:

10 (A) LENGTH: 17 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

25 AGACGTAAGC ACTGACG

17

(2) INFORMATION FOR SEQ ID NO:22:

(i) SEQUENCE CHARACTERISTICS:

30 (A) LENGTH: 22 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

5 CTTATCACAA AGGAATCTTA TC

22

(2) INFORMATION FOR SEQ ID NO:23:

(i) SEQUENCE CHARACTERISTICS:

10 (A) LENGTH: 22 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

25 CTTATCACAA AGGAATCTTA TC

22

(2) INFORMATION FOR SEQ ID NO:24:

(i) SEQUENCE CHARACTERISTICS:

30 (A) LENGTH: 28 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

5 GCTCTAGACC AGAAGGTAAT TATCCAAG

28

(2) INFORMATION FOR SEQ ID NO:25:

(i) SEQUENCE CHARACTERISTICS:

- 10 (A) LENGTH: 26 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

25 TATGGATCCT ATGTTCAAAA ATGAAG

26

(2) INFORMATION FOR SEQ ID NO:26:

(i) SEQUENCE CHARACTERISTICS:

- 30 (A) LENGTH: 26 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

5 AAAGGATCCT GAAGACGTAA GCACTG

26

(2) INFORMATION FOR SEQ ID NO:27:

(i) SEQUENCE CHARACTERISTICS:

- 10 (A) LENGTH: 25 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

5 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

25 AGAGGATCCG GTCGGTGATT GTGAA

25

(2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:

- 30 (A) LENGTH: 25 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: NO

25

10 (A) LENGTH: 27 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(iv) ANTI-SENSE: NO

27

30 (A) LENGTH: 29 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

5 CGGAATTCAA ACTTACAAAT TTCTCTAAG

29

(2) INFORMATION FOR SEQ ID NO:31:

(i) SEQUENCE CHARACTERISTICS:

10 (A) LENGTH: 25 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: YES

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

25 TAAGGATCCT TTCCGCCCTT ACATT

25

(2) INFORMATION FOR SEQ ID NO:32:

(i) SEQUENCE CHARACTERISTICS:

30 (A) LENGTH: 25 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: YES

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

5 CATGGATCCT CTATGTCTCT TTCAC

25

(2) INFORMATION FOR SEQ ID NO:33:

(i) SEQUENCE CHARACTERISTICS:

10 (A) LENGTH: 22 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

25 ACAGGATCCG ACCTTATCTT CT

22

(2) INFORMATION FOR SEQ ID NO:34:

(i) SEQUENCE CHARACTERISTICS:

30 (A) LENGTH: 26 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: YES

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

5 ACCGGATCCT CTTCTTTTCA TTGTTC

26

(2) INFORMATION FOR SEQ ID NO:35:

(i) SEQUENCE CHARACTERISTICS:

10 (A) LENGTH: 24 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

15 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: YES

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

25 TCAGGATCCT TTTCTTCGCC TGGT

24

(2) INFORMATION FOR SEQ ID NO:36:

(i) SEQUENCE CHARACTERISTICS:

30 (A) LENGTH: 23 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

35 (ii) MOLECULE TYPE: DNA (genomic)

(iii) HYPOTHETICAL: NO

(iv) ANTI-SENSE: YES

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

5 ATAGGATCCA TATGTGCCGC ATA

23

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